Power Circuit Breakers

Breakers automatically interrupt power flow on a transmission line at the time of an electrical fault. Depending upon the final design, eight or nine breakers would be provided in the substation to connect the proposed power plant to the Mead-Phoenix Project 500-kV transmission line. The type of breaker planned for the proposed substation, called a gas breaker, would be insulated by special nonconducting gas (sulfur hexafluoride [SF_6]). Small amounts of hydraulic fluids would be used to open and close the electrical contacts within the breaker.

SF_6 is a greenhouse gas. The use, storage, and replacement of SF_6 would be monitored and managed by Western to minimize any releases to the environment. SF_6 gas in substation circuit breakers would be contained within sealed units. Equipment as delivered from the manufacturer would be required to be factory-tested and certified not to leak. After installation, the equipment would be scanned for detection of leaks, and repairs made as appropriate. During use, the equipment would be monitored by periodic substation inspections for indications of leakage. During servicing, SF_6 gas would be evacuated using sealed gas containment equipment, thereby remaining totally contained.

Switches

Switches are devices used to mechanically disconnect or isolate equipment. Switches would be located on both sides of circuit breakers.

Buswork, Bus Pedestals

Power moves within a substation and between breakers and other equipment on bundled aluminum conductors, which are elevated by bus poles and towers called bus pedestals. Buswork within the proposed substation would transport the entire plant's power output to the Mead-Phoenix Project 500-kV transmission line. Bus pedestals would be grounded in accordance with the National Electrical Safety Code (NESC).

Substation Fence

A chain-link fence with standard barbed wire on top would provide security for the substation. Adequate space would be provided inside the fence to maneuver construction and maintenance vehicles. The fencing would be grounded in accordance with the NESC.

Substation Rock Surfacing

A 6-inch layer of rock and binder material selected for its insulating properties would be placed on the ground within the proposed substation to help protect operation and maintenance personnel from electrical danger in the event of electrical failures.

Control House

Electric/electronic controls and monitoring equipment for the power system would be housed in a building within the proposed substation. Control houses would be heated and air-conditioned to provide a controlled environment for equipment. Electrical service would be provided by a station-service transformer that would provide 208/120-volt (V) service to the control house.

2.2.2.2 Transmission Interconnection

The proposed substation would be located east of the Mead-Phoenix Project 500-kV transmission line between two existing transmission line structures. Western proposes to install two new turning dead-end structures to provide a tie with the new substation. Each turning structure would be a steel-lattice self supporting tower or three new single-pole structures, and provide for turns of 90 degrees or greater into the new substation. It is envisioned that the new structures would be located within the existing Mead-Phoenix Project 500-kV transmission line right-of-way in the span between the two existing structures west of the proposed substation. However, depending on outage requirements, it may be necessary to erect the structures adjacent to, and east of, the existing right-of-way to reduce outage time during installation, or install temporary wood-pole structures to bypass the substation until the proposed power plant is ready for interconnection.

Prior to placing the substation in service, the existing Mead-Phoenix Project conductors in the span west of the substation would be cut and attached to the new turning structures. New conductors would be installed from the new turning structures to A-frame tubular steel take-off structures, and between the take-off structures and bus tubing within the substation. Typical dead-end turning structures are shown on Figure 2-9. The locations of the new dead-end structures are indicated on Figure 2-4a.

2.2.2.3 Communication Facilities

Primary Communication System

Substation equipment would be operated remotely from the Western Desert Southwest Region Operations Center in Phoenix through a Supervisory Control and Data Acquisition (SCADA) system. The system would communicate with the control house of the proposed substation through links with an existing microwave system. To provide the links, Western would install a communications tower within the proposed substation adjacent to the control house. The height of the tower would be determined during the design phase of the communication tower, but is expected to be less than 60 feet high. A microwave dish about 10 feet in diameter would be installed on the tower and pointed towards an existing Western microwave tower at Hayden Peak in the Hualapai Mountains. A microwave dish about 10 feet in diameter would be added to the Hayden Peak tower. The addition of the microwave dishes would provide a link with Western’s existing microwave communications system.

Dual/Redundant Communication System

A redundant communication system also would be installed. The redundant system would be designed to provide a backup communication system in the event that the primary communication system is interrupted. There are two options for installing the redundant communication system. The first option would include the following two actions:

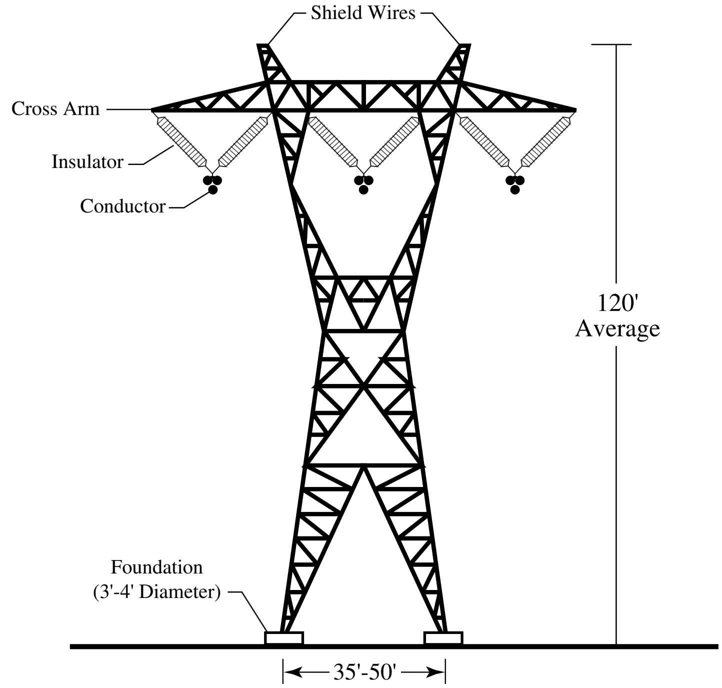
1. Replacing an existing overhead static wire with an optical ground wire (OPGW) on the existing Mead-Liberty 345-kV transmission line between the proposed substation and Western’s existing Peacock Substation. From the Peacock Substation, there is a fiber optic path to Western's Phoenix Substation in Phoenix. The Peacock Substation is about 46 miles north of the proposed substation.

2. Adding a microwave link between Western’s Phoenix Substation and Perkins Substation via an existing Western microwave facility at Towers Mountain (located at latitude 34 degrees, 14', 06", longitude 112 degrees, 21', 59"). New microwave dishes would be required at Phoenix, Towers Mountain, and Perkins.

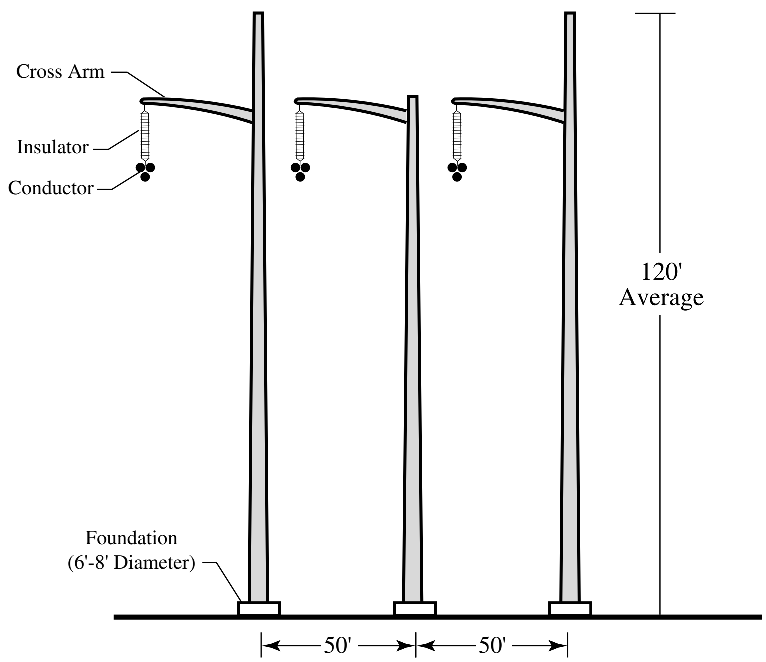
The second option would involve linking the proposed substation with the existing Salt River Project (SRP) microwave system, which currently is being used as a backup for the Mead-Phoenix Project 500-kV transmission line. This option would entail installing microwave dishes at the proposed substation and an existing SRP microwave facility. An intermediate tower may be required if a microwave path cannot be found between the proposed substation and an SRP microwave tower. Western would select the redundant communication system upon completion of further communications study.

Regeneration stations would not be required for the installation of OPGW. Western would own the OPGW, electronics equipment used by Western, and the ancillary facilities. The Project would not change the size of the right-of-way or the way in which the transmission line is maintained. No new road construction would be required. New ground disturbance during construction would be limited to pulling and tensioning sites along the Mead-Liberty 345-kV transmission line, trenching between the

Self-supporting Steel-lattice



Self-supporting Tubular Steel



Note: Dimensions are approximate
Drawings are not to scale

Dead-end Turning Structure
Big Sandy Energy Project EIS

Figure 2-9

substation and a transmission structure on the Mead-Liberty 345-kV transmission line, west of the proposed substation, and OPGW spool storage and handling areas. It is anticipated that all pulling and tensioning sites would be within the existing transmission line right-of-way. Each pulling and tensioning site would temporarily disturb an area about 120 by 120 feet or 0.33 acre. The sites would be located in previously disturbed areas to the extent feasible within the existing right-of-way. The number of pulling and tensioning sites would depend on the lengths of OPGW procured for the installation. Typically, the cable lengths average about 3 miles in length. Therefore, with a length of about 46 miles, 15 sites would be needed, involving the temporary disturbance of about 5 acres of existing right-of-way.

The OPGW would be composed of not more than 48 dielectric fibers (which do not conduct electricity) encased in a metal jacket that protects the fibers and serves the purpose of the static line it would replace. The fibers with their protective coatings, including the metal jacket, would create a cable about 1 inch in diameter. The cable would not emit any additional noise, or electric or magnetic fields. The OPGW would be attached at or near the top of each electrical transmission line structure above the electrical conductors. The OPGW would not be used for commercial purposes.

2.2.3 Water Supply System

The water supply system for the Project water requirements would consist of up to five groundwater wells, pumps, a water storage tank, and associated piping. Groundwater from a deep aquifer in the Big Sandy Valley is the planned source of water for the Project. Raw water would be provided from up to five groundwater wells drilled and completed to a depth of about 1,500 feet. Up to four of these would be on private land in Section 7, and one well that already has been drilled as a test production well is in the southwest corner of Section 5 adjacent to the proposed power plant site. A water pipeline (either aboveground or buried within the access road right-of-way) would direct the water to the proposed power plant and agricultural area. Where the pipeline would parallel the power plant access road, it would be buried within the road right-of-way. Figure 2-10 shows the proposed location of the wells and water pipelines, plus other plant utilities.

Under normal operating conditions, two of the wells would be pumped at any one time, each at a rate of about 1,200 gpm. The wells would be cycled at about two-week intervals. The maximum pumping rate would be about 5,000 gpm, which would utilize up to all five of the wells. The maximum annual consumption of water would be about 4,850 acre-feet (equivalent to 3,000 gpm). Approximately 81 percent of the water extracted would be used for cooling within the cooling towers themselves and 2 percent of the water would be conveyed to the evaporation ponds. Of the remaining 17 percent, approximately 13 percent would be used for the proposed agricultural activities, and 4 percent would be used for plant personnel and evaporative losses.

The electrical groundwater pumps would be powered from the proposed power plant via an underground 4,160-V electrical circuit. That line, and a control line, would be buried in or immediately adjacent to the well access roads.

An aboveground pipeline from each well would be constructed to a 250,000-gallon water storage or "head" tank to be located on the northeast well pad site in Section 7 (Figure 2-10). A single underground line would convey water from this tank to the 600,000-gallon raw water supply tank on the proposed power plant site near the administration (control room) building. Some of the wells also would be able to provide water directly to the proposed agricultural activities discussed in Section 2.2.6 through either aboveground or buried pipelines that would be placed within the access road right-of-way.

Demineralized water for power plant requirements would be generated from the well water using a reverse-osmosis system, followed by a mixed-bed demineralizer unit. The output of this unit would go to one demineralized water storage tank with a capacity of about 600,000 gallons, located on the proposed power plant site near the raw water tank. It then would be distributed to the various users within the proposed power plant and associated facilities.

2.2.4 Access Road

Access to the proposed power plant site, groundwater well field, and other properties in the vicinity would be principally provided by about 2.3 miles of a new Mohave County road. The road would begin at the Cholla Canyon Ranch Road intersection with US 93, cross Sycamore Creek, and end at the proposed power plant. The portion of the access road from the southwest corner of Section 5 to the proposed power plant would be a private road.

The Mohave County road would be constructed within a 150-foot-wide county road and utility easement adjacent to the section lines between Sections 1 and 12, T15N, R13W and Sections 6 and 7, T15N, R12W. The Mohave County road right-of-way would not be fenced. The private road would be posted to reduce unauthorized access to private lands.

The area needed for construction would be a 90-foot wide path for a total disturbed area of 21 acres. The width of the permanent roadbed would be 26 feet wide. The road would include a concrete box culvert at the Sycamore Creek crossing and seven pipe culverts at smaller drainages. The concrete box culvert across Sycamore Creek would be constructed of 10 individual boxes, each having a cross-section of 12 feet wide by 8 feet high and each will be 58 feet long as the creek flows. The boxes would be constructed side by side and extend 120 feet across the Sycamore Creek streambed. The culvert would provide an 8-foot clearance above the streambed and an apron with riprap would be provided at grade on the downstream side of the culvert. The box culvert and road would be designed to handle a 100-year storm event.

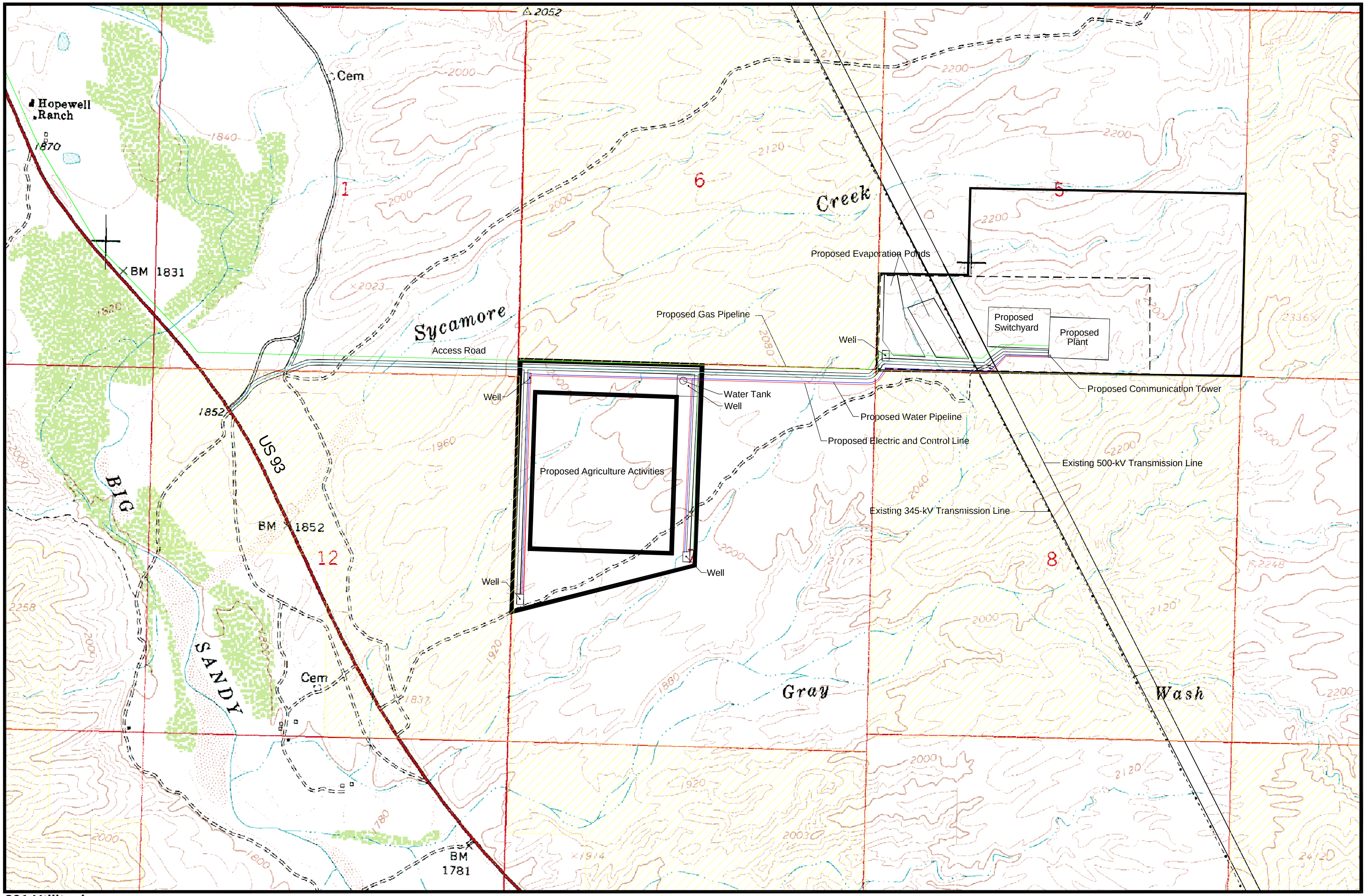
Figure 2-11 shows the proposed location of the access road and associated land jurisdiction. The road would cross about 700 feet of BLM-managed public land at the junction with US 93 and a small portion of BLM-managed land at the southwest corner of Section 5.

2.2.5 Natural Gas Supply Pipeline

A new 16- to 20-inch diameter high-pressure underground natural gas supply pipeline would bring natural gas to the proposed power plant from one or more of three interstate natural gas transmission pipelines located about 39 miles north of the proposed power plant site, immediately north and south of I-40. The proposed natural gas supply pipeline would have a nominal 50-foot-wide right-of-way and request authorization for construction disturbance within a nominal 100-foot-wide area. The pipeline would be constructed, owned, and operated by either the Project proponent (Caithness) or another entity. Figure 2-12 depicts the location of the proposed and alternative pipeline corridors evaluated in this Draft EIS.

This Draft EIS uses a corridor concept to locate and analyze alternative pipeline routes. Rather than identifying a specific alignment for the pipeline right-of-way, the routes follow broader corridors that allow adjustments to be made in the final engineered alignment of the pipeline, so that constraints identified during pre-construction surveys and right-of-way negotiations can be accommodated. Use of corridors rather than a specific alignment in this EIS provides the flexibility to make adjustments for these circumstances.

To the extent feasible, the pipeline would be located within a corridor such that permanent displacement of an existing use, such as a residence or business, is avoided. Compensation for use of lands would be determined through mutually agreeable business negotiations or, to the extent applicable, a court of law under a condemnation action. If the pipeline owner does not have the power of eminent domain, it would not be able to initiate a condemnation action and no use of the land would occur unless the proponent obtained the consent of the landowner.



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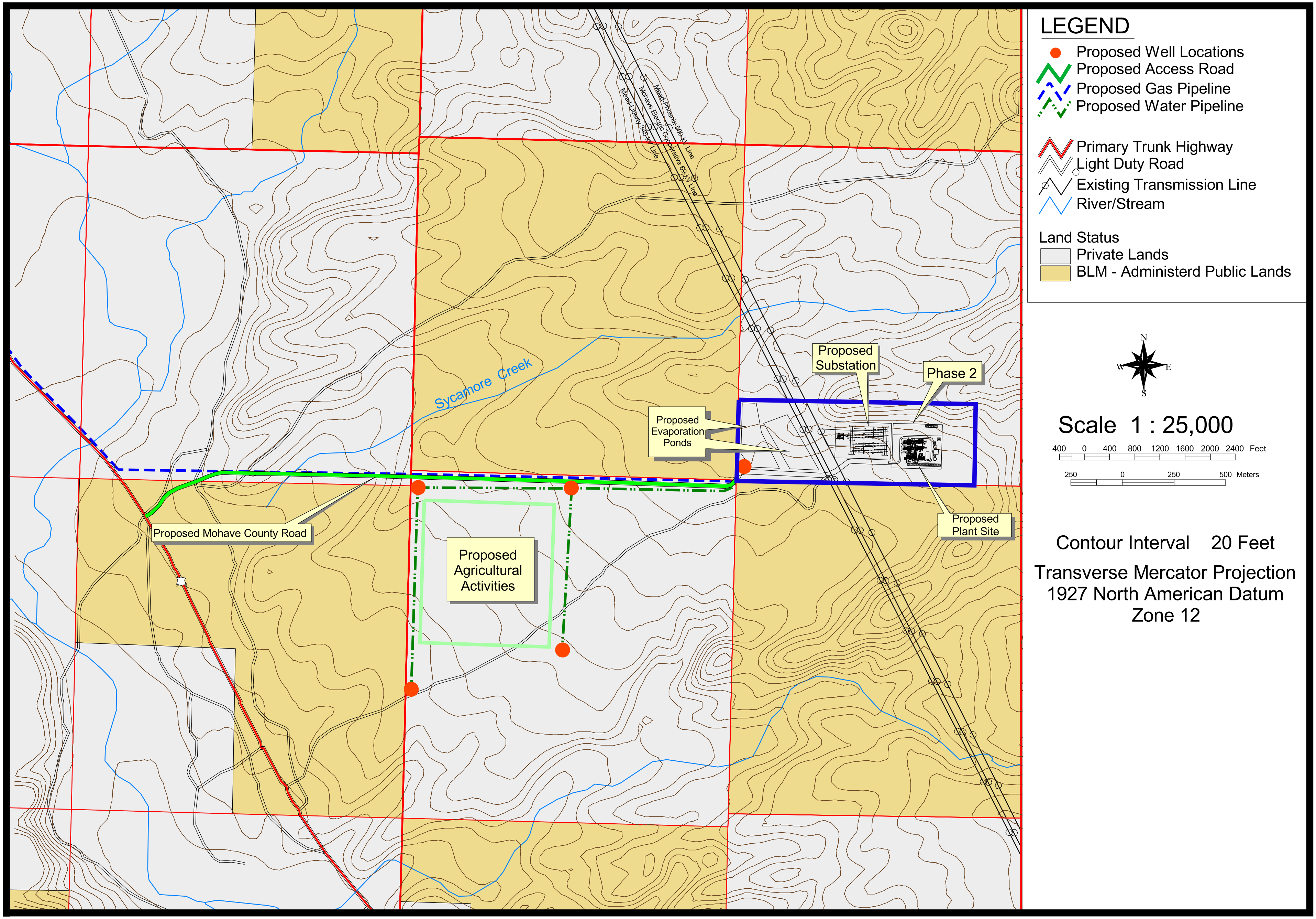
Conceptual Utility Layout/Water Supply Wells

Big Sandy Energy Project EIS

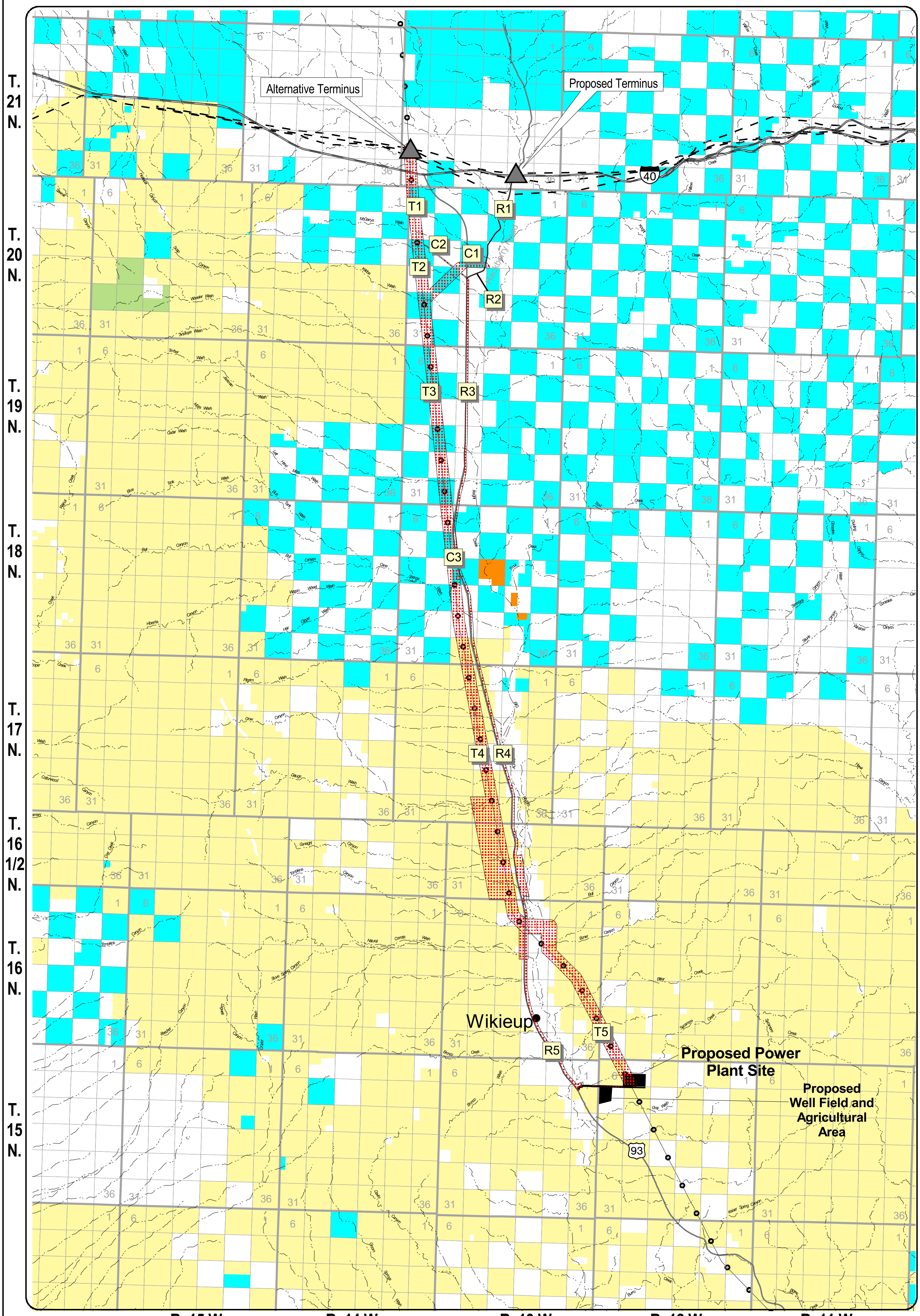
Figure 2-10



Proposed Access Road

Big Sandy Energy Project EIS

Figure 2-11



Legend

Project Components

- Pipeline Corridor Segments
  - Proposed Pipeline Corridor - R1,C1,T3,C3,T4,R5
  - Alternative R Corridor - R1,R2,R3,C3,R4,R5
  - Alternative T Corridor - T1,T2,T3,C3,T4,T5
- R1 Road Corridor Segment
- T1 Transmission Line Corridor Segment
- C1 Crossover Corridor Segment
- Proposed Plant Facilities

Land Ownership and General Reference

- Private
- State
- BLM
- Hualapai Reservation
- Parks
- Existing Pipelines
- Mead-Liberty/Mead-PhoenixTransmission Lines
- Stream/River
- 40 Interstate
- 93 U.S. Route

Proposed and Alternative Natural Gas Pipeline Corridors

Big Sandy Energy Project EIS

0 5

Scale in Miles

Universal Transverse Mercator Projection
1927 North American Datum
Zone 12

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Figure 2-12

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Natural Gas Pipeline Terminology

Proposed and alternative corridors were developed by delineating areas within which the pipeline could be sited. The corridors were broken down into links or corridor segments, based on where the corridors interconnected, to facilitate the analysis. The final pipeline alignment could fall anywhere within the corridors. The following terminology will be used in the description of the pipeline alternatives:

- **Route** – the full length of either a pipeline alignment or pipeline corridor segments that allow the pipeline to be built from the start point to the end point (from near existing gas pipelines near I-40 to proposed power plant)

- **Alignment** – the specific location for the pipeline (that is, it will be built "here")

- **Corridor** – the more general area within which the pipeline would be built

- **Corridor Segments** – sections of pipeline corridor which, when pieced together, could define a pipeline route; sometimes referred to as "links." Segments are described in detail in Table 2-2.

This EIS analyzes the effects of construction and operation of the natural gas pipeline, including required construction staging areas and a nominal 90-foot-wide area of disturbance along the route, within each corridor segment. However, once detailed pre-construction surveys are complete and any site-specific issues are resolved, the final alignment of the pipeline within the corridor segments will be selected and approved by the agencies.

As can be seen on Figure 2-12, both the proposed and alternative pipeline corridors consist of various combinations of 13 individual corridor segments, ranging in width from 100 feet (within road rights-of-way) to nearly 1 mile (to provide additional room to avoid sensitive resources and topographic obstacles). These segments have been assigned alphanumeric designations. The five corridor segments following existing or proposed roads (Hackberry Road, US 93, and the new Mohave County access road) have been labeled R1 through R5 ("R" for "road"). The five corridor segments following the Mead-Liberty 345-kV and Mead-Phoenix Project 500-kV transmission lines have been labeled T1 through T5 ("T" for "transmission"). Three corridor segments that provide for potential crossover between the road and transmission line corridors have been labeled C1 through C3 ("C" for "crossover"). Detailed descriptions of the 13 segments are provided in Table 2-2, and Table 2-3 summarizes the length (in miles) associated with each segment.

The Proposed Action (proposed route) for the gas pipeline follows the following sequence of corridor segments:

R1 - C1 - T3 - C3 - T4 - R5

The following describes the general path of the proposed route; refer to Table 2-3 for additional detail on the location and width of each corridor segment.

The proposed pipeline would begin at the points of connection with one or more of the three potential gas transmission pipelines, in Section 3, T20N, R13W and/or Section 35, T21N, R13W. From this connection, the pipeline would proceed along corridor segment R1, heading south in the 100 to 150-foot-wide right-of-way of Hackberry Road, a Mohave County road. There is an existing underpass where Hackberry Road goes under I-40 that the pipeline would follow. This corridor segment is about 3.9 miles long and passes through relatively undeveloped private and state-owned lands.

The proposed pipeline would then follow corridor segment C1, which begins at the intersection of Hackberry Road and the southeast corner of Section 16, T21N, R13W. The corridor segment heads to the west, crossing US 93 on a path that avoids the planned traffic interchange at the junction of Hackberry Road and US 93. It then turns southwest and increases in width to 2,000 feet until intersecting the transmission line corridor at the junction of segments T2 and T3. This corridor segment

TABLE 2-2 CORRIDOR SEGMENT DESCRIPTIONS	
Segment	Description
Road Segments	
R1	This corridor segment begins at the northernmost potential supply pipeline (Questar) located in T21N, R13W and heads south along Hackberry Road, crossing under I-40. This segment encompasses the Mohave County Hackberry Road right-of-way, which varies between 100 and 150 feet wide. The corridor segment is approximately 3.9 miles long and passes through relatively undeveloped, privately owned and State Trust land. This corridor segment ends at the intersection of Hackberry Road and the southeast corner of Section 16, T21N, R13W, where it intersects with corridor segment C1.
R2	This corridor segment begins at the southern end of corridor segment R1, and encompasses the Hackberry Road right-of-way to its junction with US 93. The corridor segment, which is approximately 0.8 mile long, passes through privately owned lands.
R3	This corridor segment begins at the southern end of corridor segment R2, and follows along the eastern edge of the US 93 right-of-way south until US 93 and the transmission line corridors overlap near the boundary of Sections 4 and 5, T18N, R13W. This corridor is 400 feet wide, immediately adjacent to the eastern edge of the US 93 right-of-way. The corridor segment is about 9.3 miles long, and crosses primarily privately owned land, although there is a small amount of State Trust land near the southern end of the corridor segment.
R4	This corridor segment begins in Section 16, T18N, R13W, just south of corridor segment C3, which is the crossover segment that encompasses the overlap between the road and transmission line corridors in T18N, R13W. Segment R4 continues south along US 93 just east of the US 93 right-of-way to the intersection with the transmission line corridor in T16N, R13W, a distance of about 13.7 miles. The corridor primarily crosses public land managed by the BLM and privately owned land, but also a small area of State Trust land. This corridor segment generally is 400 feet wide, although there are the following two areas of variation: Within the public land designated as the Carrow-Stephens Area of Critical Environmental Concern (ACEC) (in Sections 21 and 28, T16.5N, R13W), the corridor also includes the 200-foot-wide US 93 right-of-way. This variation allows the pipeline to be installed within the highway right-of-way to minimize impacts to historic features within the ACEC. [The Arizona Department of Transportation (ADOT) eventually plans to relocate US 93 approximately 2 miles to the west in conjunction with upgrading the highway to a four-lane roadway.] For a distance of 1.5 miles south of Gunsight Canyon (in Section 28, T16.5N, R13W), the corridor width increases to 1,500 feet immediately along the eastern edge of the US 93 right-of-way to accommodate the planned realignment of US 93 to the east of the existing roadway in this area.
R5	This corridor segment begins at the southern end of corridor segment R4 and follows along US 93 south to the proposed Mohave County access road where it turns east to follow the access road to the plant site. The length of this corridor is about 8.5 miles. The corridor segment crosses privately owned and BLM-managed lands. The corridor segment varies from 150 feet wide to 1,800 feet wide, as described below. From the beginning of the corridor segment, extending about 1.25 miles to the south, the corridor is expanded to 1,000 feet west and 600 feet east of the US 93 right-of-way, and includes the 200-foot US 93 wide right-of-way itself. This corridor expansion is intended to avoid conflicts with the proposed expansion of US 93 and adjacent topographic features. From the point that the 1,800-foot wide corridor ends, south through Wikieup to the plant access road, the corridor is 600 feet wide, immediately adjacent to the eastern edge of the US 93 right-of-way, and also includes the 200-foot-wide US 93 right-of-way, providing an opportunity to avoid existing features east of the ADOT right-of-way and the proposed expansion of US 93. The access road corridor encompasses the proposed Mohave County 150-foot-wide road right-of-way. In addition, the westernmost 1,500 feet of the corridor is expanded to 750 feet north of the access road right-of-way to accommodate the transition of the pipeline from US 93 to the access road.

TABLE 2-2 CORRIDOR SEGMENT DESCRIPTIONS	
Segment	Description
Transmission Line Segments	
T1	This corridor segment begins north of I-40 at the northernmost potential supply pipeline in Section 30, T21N, R13W, and extends south about 3.7 miles to Old Highway 93 in Section 18, T20N, R13W. This corridor segment extends 1,000 feet west and east of the 150-foot-wide right-of-way for the Mead-Liberty 345-kV transmission line and 1,000 feet west of the adjacent 175-foot-wide right-of-way for the Mead-Phoenix 500-kV transmission line and includes both rights-of-way, for a total corridor width of 2,325 feet. This corridor segments crosses private and State Trust land.
T2	This corridor segment begins at the southern end of corridor segment T1 and follows along the same transmission line rights-of-way for a length of about 2.1 miles into Section 30, T20N, R13W. This corridor segment, which is the same width as Segment T1, crosses private and State Trust land.
T3	This corridor begins at the southern end of corridor segment T2 and follows the same transmission line rights-of-way south for about 8.5 miles to Section 5, T18N, R13W where corridor segment C3 begins. This corridor segment has the same width as corridor segments T1 and T2, and crosses private and State Trust land.
T4	This corridor segment begins in Section 16, T18N, R13W, just south of corridor segment C3. This corridor segment is about 13.8 miles long, terminating at the intersection of the transmission line rights-of-way and US 93. Like corridor segments T1, T2, and T3, this corridor segment is 2,325 feet wide except that this corridor segment increases to a width of 4,000 feet west of the transmission line rights-of-way for a distance of approximately 4.0 miles from the northern boundary of Section 34, T17N, R13W, south to the boundary between T16.5N and T16N. This expansion allows for complete avoidance of the Carrow-Stephens Ranches ACEC and rugged topography. This corridor segment crosses privately owned, BLM-managed public, and State Trust lands.
T5	This corridor segment begins at the southern end of corridor segment T4 and extends southeast about 7.8 miles to the plant site. This corridor segment is also 2,325 feet wide and follows the transmission line rights-of-way except to accommodate a perpendicular crossing of the Big Sandy River, where the corridor segment leaves the transmission lines rights-of-way to become a 3,000-foot wide corridor centered on the northern and eastern boundary of Section 10, T16N, R13W.
Crossover Segments	
C1	This crossover corridor segment begins at the intersection of Hackberry Road and the southeast corner of Section 16, T21N, R13W. This corridor segment extends to the west, encompassing 1000 feet across the southern end of this section and crossing US 93 on a route that avoids the planned traffic interchange at the junction of US 93 and Hackberry Road. From the southwest corner of Section 16 the corridor increases to 2000 feet in width and turns southwest, crossing straight through the southwest corner of Section 20 until intersecting the transmission line corridor at the junction of corridor segments T2 and T3. This corridor segment, which is about 2.8 miles long, crosses private and State Trust land.
C2	This corridor segment encompasses Mohave County's 100-foot-wide right-of-way for Old Highway 93 between the transmission line and US 93 corridors. This segment, which is about 2.3 miles long, crosses private and State Trust land.
C3	This corridor segment is located where the transmission line and US 93 corridors overlap in T18N, R13W. The eastern boundary of this corridor segment is 400 feet east of the existing US 93 right-of-way and the western boundary is 1,000 feet west of the Mead-Liberty 345-kV transmission line right-of-way. This crossover corridor segment is about 1.9 miles long and crosses private and State Trust land.

TABLE 2-3 LENGTH OF LINKS FOR BIG SANDY ENERGY PROJECT	
Corridor Segment	**Miles**
C1	2.8
C2	2.3
C3	1.3
R1	3.9
R2	0.8
R3	9.3
R4	13.7
R5	8.5
T1	3.7
T2	2.1
T3	8.5
T4	13.8
T5	7.8
Totals	78.9
Road Corridor	
R1	3.9
R2	0.8
R3	9.3
C3	1.9
R4	13.7
R5	8.5
Totals	38.1
Transmission Line Corridor	
T1	3.7
T2	2.1
T3	8.5
C3	1.9
T4	13.8
T5	7.8
Totals	37.6
Proposed Corridor	
R1	3.9
C1	2.8
T3	8.5
C3	1.9
T4	13.8
R5	8.5
Totals	39.3

crosses both private and state-owned lands and is about 2.8 miles long.

The proposed route then follows corridor segment T3, which parallels the existing transmission lines south for about 8.5 miles to the beginning of segment C3 in Section 5, T18N, R13W. This corridor segment is 2,325 feet wide, encompassing both transmission line rights-of-way and 1,000-foot-wide buffers on either side. It crosses both private and state-owned lands.

Corridor segment C3 is a crossover segment located where the transmission line and US 93 corridors overlap in Section 5, T18N, R13W. The corridor segment is about 1.9 miles long and crosses private and state-owned lands. The corridor here extends from 1,000 feet west of the Mead-Liberty 345-kV transmission line to 400 feet east of the US 93 right-of-way.

The proposed route then follows corridor segment T4, continuing southeast along the transmission line route. This corridor segment is about 13.8 miles long, terminating at the intersection of the transmission line rights-of-way and US 93. This segment is 2,325 feet wide except in one location, where it extends to a width of 4,000 feet along the western boundary of the Carrow-Stephens Ranches Area of Critical Environmental Concern (ACEC). This corridor segment crosses private, BLM-managed public, and state-owned lands.

From this point, the proposed route follows corridor segment R5, which follows along US 93 south to the proposed access road leading to the proposed power plant site. The county's right-of-way would cross Sections 1, 5, and 7, T15N,R12W, and enter the proposed power plant site over the section corners of Sections 5, 6, 7, and 8, T15N, R12W. This corridor segment is about 8.5 miles long and varies in width from 150 feet wide along the proposed access road, to 1,800 feet wide along certain portions of US 93.

Gas metering interconnect facilities would be installed at the northern terminus of the pipeline, at its tie into the Questar Southern Trails located north of I-40, and/or to the El Paso Natural Gas and/or Transwestern gas transmission pipelines located south of I-40. These facilities would consist of isolation valves, control valves, metering equipment, and filter separators. This equipment would be located within new 100- by 100-foot fenced and graveled sites, adjacent to Hackberry Road. Construction disturbance may be as large as 150 by 150 feet. Each metering facility would be enclosed within a small building on each site. In addition, a small communication tower (about 15 feet high) would be included within each fenced site. Electric power service would be provided to each metering site from existing electric distribution lines available within 100 feet of the site. Access to each pipeline meter interconnect facility would be from Hackberry Road.

At the southern terminus of the pipeline, a gas metering facility would be installed at the proposed power plant. This facility would consist of isolation valves, metering equipment, a filter separator, and pressure reduction and control valves used to feed gas to the turbines. The metering facility would be installed within the proposed power plant site.

At full capacity, the proposed power plant would use, and the gas pipeline would deliver, about 106.4 million cubic feet (MMCF) of gas per day, which is equivalent to 3,246 MMCF per month, or 38,960 MMCF per year. The potential exists to tap this pipeline and thereby supply gas to the Wikieup area (refer to Section 2.4.6, Wikieup Gas Tap).

Inspection of the pipeline would be accomplished by the pipeline owner and operator in accordance with U. S. Department of Transportation regulations, Parts 192.105, 106, and 107. The pipeline would be patrolled by air every six months. Routine inspection also would be conducted annually using vehicles that can drive directly over the pipeline (two-track access, resulting in, at worst, a 10-foot-wide pathway over the pipeline that would remain permanently disturbed). Areas not accessible by the vehicles (steep terrain, Big Sandy River, within the ACEC) would be inspected by foot. If leaks are encountered, they would be isolated, exposed, and repaired in accordance with industry practices. If excavation is needed to replace a section of pipe, the landowner or land manager would be notified and reclamation procedures would be followed as outlined in Appendix B.

2.2.6 Agricultural Development

In addition to the activities directly related to the electrical generation process, the Proposed Action would involve supplying selected lands and water to the Mohave County Economic Development Authority (MCEDA) for agricultural use. Agricultural development would occur on about 107 acres, located about 1 mile southwest of the proposed power plant site in the northwest quarter of Section 7, T15N, R12W. Water for agricultural use would be well water (i.e., non-process water provided from the same water wells that would supply water for the proposed power plant). A maximum of 400 gpm (650 acre-feet per year) of water would be made available for agricultural use in this area. This amount of water would be provided if the crops produced required this much water and would be subtracted from the proposed water budget of 4,850 acre-feet per year for all Proposed Action (power plant and agricultural) uses. This proposed agricultural use of both land and water would continue even after plant closure.

Agricultural activities are proposed to include mainly forage crops or fruit/nut orchards. The following are potential crops that are being considered for the area, with their respective irrigation requirements:

Crop	**Water Requirement (per acre)**
Bermuda grass	5 to 6 acre-feet per year
Alfalfa	6 acre-feet per year
Small Grains	2 to 3 acre-feet per year
Vegetables (High Value)	2 to 3 acre-feet per year
Pecan Nuts	4 to 5 acre-feet per year
Olives	4 to 5 acre-feet per year

Source: Grumbles 2001

Areas within this 107 acres with significant gullying, rilling, or lack of topsoil due to slope or other factors would not be used for crop production. Soils also would be tested to determine if high quantities of gypsum, lime, or other minerals resulting in high pH would limit productivity and treated if necessary.

Agricultural fertilizers and pesticides, including herbicides, would be applied as applicable for the specific agricultural operations. Specific fertilizer, pesticide/herbicide and other chemical requirements and application rates would depend on the type of crops grown. Application rates would follow manufacturers' instructions and all pesticides would be EPA-registered and approved for use on the specific crops grown. Standard agricultural practices to minimize erosion and runoff of applied chemicals and soil would be employed. Depending on the crop, these would include tilling with the contour, avoiding major washes in the area, establishing a buffer area between tilled areas and drainages, and establishing tail water areas for irrigation water to be collected and infiltrated. Table 2-4 lists those pesticides, herbicides, or other chemicals that could be expected to be used, based on the type of crops anticipated to be grown on the designated agricultural area.

2.2.7 Project Construction

The following sections describe the construction activities that would be completed under the Proposed Action associated with the proposed power plant and substation, water supply system, proposed access road, and proposed natural gas supply pipeline. Table 2-5 summarizes the ground disturbance acreage for each of these areas and some associated facilities, plus the agricultural area. Each section below provides more detail about the activities that would occur within the acreages listed.

Equipment used for construction activities would include temporary power supply generators, dozers, backhoes, graders, trenchers, air compressors, light and heavy trucks, and cranes. Cranes would range in capacity from 20 tons to 225 tons. Heights would range from about 80 feet to 250 feet. All equipment would generate noise of varying levels and at different times, but would be expected to average about 85 dBA at 50 feet.

2.2.7.1 Power Plant Construction

The proposed power plant and associated facilities would be constructed by a primary contractor that would perform the Engineering, Procurement and Construction (EPC) activities for the project. The EPC contractor would undertake final plant design, equipment procurement, and construction all under contract to Caithness.

The proposed site includes adequate area for construction parking, work trailers, storage, and lay-down areas. The primary access during construction would be from US 93 along the proposed access road.

As previously noted, the power plant is proposed to be constructed in two phases: Phase 1, consisting of a baseload 500 MW, natural gas-fired, combined-cycle generating facility and 500-kV substation; and Phase 2, consisting of a 220-MW single-shaft combined-cycle generator. The construction phasing for Phase 1 is expected to begin in during the third quarter of 2001 and be completed within 20 months, as follows:

Site Preparation, Access Road, and Water Supply System	Months 1 through 6
Foundations	Months 4 through 12
Building Erection	Months 8 through 12
Mechanical Installation	Months 10 through 14
Electrical Installation	Months 10 through 14
Gas Pipeline Construction	Months 8 through 14
Commissioning and Startup	Months 14 through 20

Table 2-4
PESTICIDES/HERBICIDES AND OTHER CHEMICALS THAT MIGHT BE USED ON THE PROPOSED AGRICULTURAL AREA

2,4-D	Mancozeb
Abamectin	Mepiquat Chloride
Acephate	Metalaxyl
Benefin	Methomyl
Benlate 50 WP	Methyl Parathion
Benomyl	Permethrin
Bensulide	Pounce 3.2EC
Bifenthrin	Princep Caliber 90
Bromoxynil	Promamide
Chlorothalonil	Prometryn
Chlorpyrifos	Pyritiodac-Sodium
Cygon 400	Rodent bait
Cypermethrin	Roundup
Cytokinin	Rovral
DCPA	Sevin 805
Disulfoton	Sodium Chlorate
Endosulfan	Spinosad
Fenvalerate	Sulfur
Fluazifop	Supracide 2EC
Goal 1.6E	Supreme Oil
Goal 2XL	Surflan 4AS
Guthion 50W	Thiodicarb
Imidacloprid	Tribufos
Karmex DF	Trifluralin
Kocide	Vinclozolin
Lambdacyhalothrin	

Construction is anticipated to occur in one 10-hour shift per day, 5 days per week, during daylight hours.

Construction of Phase 2 is expected to commence within 18 months following completion of Phase 1, with a similar schedule for those applicable components of this phase.

Specific plans or proposed measures for desert tortoise protection, fugitive dust control, erosion and sedimentation control, site reclamation, stormwater runoff control, and biological/cultural resources protection that would be implemented as part of the construction process are presented in Section 2.2.8.

Cut/Fill Activities

A total of about 800,000 cubic yards of soil is assumed for cut/fill for the proposed power plant and substation site combined. The cut/fill activities would be balanced over the proposed power plant and substation sites, such that soil would not need to be imported or exported. Areas of substantial cut or fill would be engineered to ensure stability. Areas of clayey or expansive soils would either be avoided or properly engineered to ensure that structures are stable.

Construction Auxiliaries

Construction water required would be approximately 300 gpm. This rate would be variable based on the activities scheduled at the site at the time. The water would be used primarily for earthworks such as compaction. The water would be required during the anticipated 20-month construction timeframe. Water for construction would be supplied from the production well located in the southwest corner of Section 5.

TABLE 2-5 SUMMARY OF GROUND DISTURBANCE ACTIVITIES PROPOSED ACTION			
Activity	Acres of Permanent Disturbance	Acres of Temporary Disturbance*	Total Acres Disturbed
Proposed Power Plant and Immediate Site Facilities			
Power Plant	15	0	15
Power Plant Lay Down Area	0	3	3
Substation	12	0	12
Substation Cut/Fill	0	7	7
Transmission Line Turning Structures	0	1	1
Evaporation Ponds	18	0	18
SUBTOTAL	**45**	**11**	**56**
Well Pad Sites	10	10	20
Well Pad Access Roads	6	0	6
Plant Access Road (2.3 miles)	13	8	21
Agricultural Activities	107	0	107
OPGW Installation (15 pulling and tensioning sites)	0	5	5
SUBTOTAL	**136**	**23**	**159**
Proposed Pipeline Route: R1-C1-T3-C3-T4-R5			
Construction Right-of-Way	48	351	399
Additional Work Spaces	0	7	7
SUBTOTAL	**48**	**358**	**406**
TOTAL	**229**	**393**	**621**
*These areas would be disturbed only during construction.			

Electricity required for construction would be supplied by a portable diesel-powered generator (up to 1 MW) to be located on the proposed power plant site, and/or from the existing MEC 69-kV electrical line located adjacent to the Mead-Phoenix Project 500-kV transmission line

Construction Materials Available Locally

A concrete batch plant would be located on the proposed power plant site as required for construction. The batch plant would be supplied by the selected contractor and would be required to comply with all state and Federal regulations and permit requirements. The following summarizes the estimated amounts of various construction materials that would be purchased from commercially available sources and trucked to the site:

Concrete	15,600 cubic yards
Sand	4,400 cubic yards
Aggregate	8,900 cubic yards
Backfill Gravel	18,000 cubic yards
Rebar	1,092 tons

Transport of Heavy Plant Components

Heavy equipment would be delivered using US 93. All oversized transportation would be coordinated with the Arizona Department of Transportation (ADOT) and would be accomplished in accordance with ADOT's guidelines and recommendations. Turnouts at various locations along US 93 would be used, so that traffic would be able to bypass oversize loads using the highway shoulder or other previously disturbed areas at the edge of the road. The location of these turnouts would be subject to ADOT approval.

The major plant components (three combustion turbines, four generators, and two steam turbines) would be delivered using a dedicated rail (special train) from the Port of Houston, Texas to Kingman, Arizona. In Kingman, the equipment would be offloaded to oversized transport vehicles, and continue to the Project site via I-40, US 93, and the proposed power plant access road.

2.2.7.2 Substation Construction

All substation construction would be performed by Western, which would maintain and operate the substation. Except for grading, a separate contract would be issued by Western for the installation of the substation equipment.

Construction of the substation would involve the following activities:

- placing and compacting structural fill to serve as a foundation for equipment
- installing foundations for electrical equipment, buswork pedestals, control building, and transmission structures
- installing oil drains
- installing fences and gates
- hauling and laying gravel within the yard
- installing electrical equipment

Transformers that would be used are very heavy and must be transported using oversized vehicles, using the same access and procedures as described above under "Transport of Heavy Plant Components."

Surface Runoff and Erosion Control

During construction, surface water diversion ditches would be installed, and specific erosion control measures implemented. Sections 2.2.8.5 and 2.2.8.6 provide more information on the proposed measures that would be taken to prevent erosion and sedimentation.

Construction Wastes

Waste generated during construction of the proposed power plant would include waste steel, copper, and aluminum; wood transport boxes; polyvinyl chloride (PVC) cables; piping; and incidental plastics. About 300 tons of total waste would be generated from construction activities.

2.2.7.3 Water Supply Wells

Well construction would involve the clearing of about 4 acres for each well pad and associated access roads. Drilling would occur 24 hours per day, and well completion would be expected within a 45- to 60-day period. Following drilling, an electrical pump would be installed and pipelines connected. Each well site would be reclaimed with native vegetation to the greatest extent possible, and each non-reclaimed final well site would cover about 2 acres.

The water pipeline would be buried within the right-of-way of the access roads about 3 feet deep using standard trench and fill techniques. An insulated 4,160-V electrical cable and controls cable would be buried in the right-of-way of the proposed power plant and well site access roads to provide electrical power and control signals to the well pumps from the proposed power plant.

2.2.7.4 Access Road

The proposed road to access the power plant site would be about 2.3 miles long, beginning at US 93 and running east to the proposed power plant site along section boundaries. The road would be designed and constructed in accordance with Mohave County standards. The design and staking of the road would be conducted under the direction of a licensed, professional engineer. Road construction would be monitored by a qualified professional engineer or qualified inspector.

Construction equipment and techniques to be employed by the contractors selected for road construction would be standard for the industry (crown-and-ditch method). No special or additional grade or base thickness would be required. A typical roadway cross-section with width specifications is presented on Figure 2-13.

The road would be constructed by first blading or grading the area of construction, which already has been bladed to provide an unpaved access to the east. The road base would consist of an aggregate base on compacted natural earth. Road surfacing would consist of an asphaltic concrete pavement, creating a final paved road about 26 feet wide. Pipe culverts would be used where needed at drainage or wash crossings, with riprap used to control erosion. A larger concrete box culvert would be installed at the Sycamore Creek crossing. About 21 acres would be disturbed by clearing and grubbing to construct the road and culverts.

Heavy equipment and support vehicles would be required (i.e., bulldozer, grader, track hoe, front end loader, and heavy- and light-duty trucks). Clearing of vegetation and blading of soil materials would be limited to areas of construction; bladed vegetation and topsoil materials would be windrowed for future redistribution during interim and final reclamation. The road would be constructed with appropriate, adequate drainage and erosion control features/structures (i.e., cut and fill slope and drainage ditch stabilization, relief and drainage culverts, and riprap).

2.2.7.5 Natural Gas Pipeline

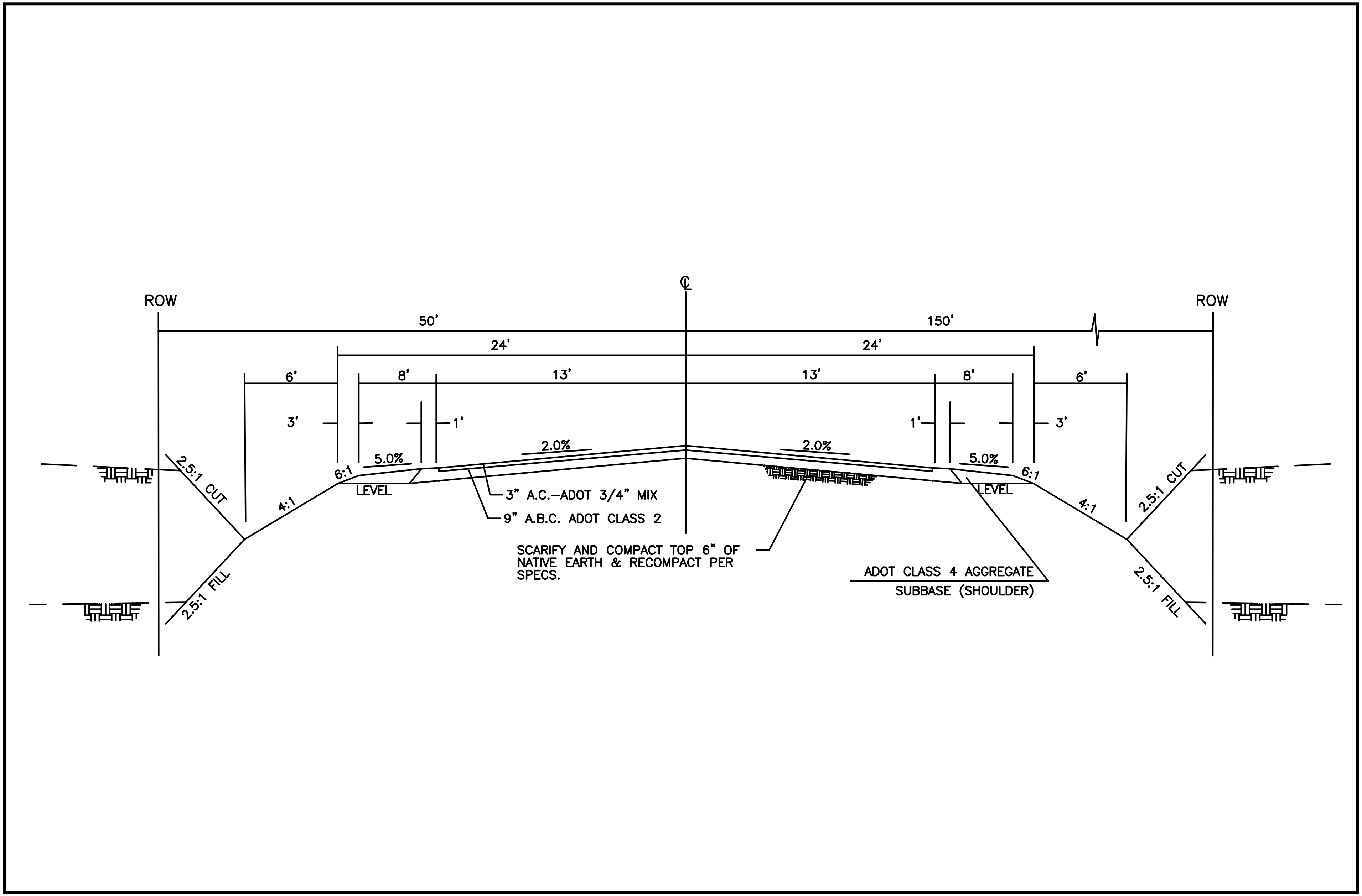
Pipeline construction activities generally would be limited to a 90-foot-wide area of disturbance within the selected pipeline right-of-way, plus several additional areas of disturbance needed for various work areas along the route. Where the pipeline parallels the proposed power plant access road, the disturbed area would be reduced to 40-foot-wide. A 50-foot width would be disturbed in wetland and riparian areas; however, a 90-foot width was used to calculate areas of disturbance, since the exact lengths of wetland crossings are not known at this time. Table 2-5 summarizes the ground disturbance (total, permanent, and temporary) expected from proposed pipeline construction.

The pipeline would consist of high-strength, 16- to 20-inch-diameter steel pipe with a minimum wall thickness of 0.281 inch. Heavy wall pipe may be used at road crossings, river crossings, through the community of Wikieup, and wherever required for loadings such as vehicular traffic crossing the pipeline. Generally, pipe sections would be welded together, externally coated with fusion-bonded epoxy for corrosion and cathodic protection, as required, placed in a trench, and buried with a minimum 3 feet of cover. Pipeline construction would take about 75 days to complete; however, construction activities at any one point along the route would last about three to five days. Construction is anticipated to occur in one 10-hour shift per day, 5 days per week, during daylight hours. Construction may occur outside of this period, but would not be conducted outside of this period at the Big Sandy River crossing due to the presence of night-roosting bats.

Construction of the gas pipeline would maintain the integrity of all existing fences, water pipelines, and other existing range improvements.

General Construction Procedures

The pipeline would be designed and constructed in accordance with “Part 192 – Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards” (49 CFR 192). Installation within the US 93 corridor would conform to requirements of ADOT’s “Guide for Accommodating Utilities on Highway Rights-Of-Way.” In addition, the U.S. Department of Transportation Federal Highway Administration “Manual on Uniform Traffic Control Devices” (MUTCD) would be followed for all work within or adjacent to the US 93 or I-40 corridor.



Mohave County Road Cross Section

Big Sandy Energy Project EIS

Figure 2-13

Wherever the pipeline route would parallel or lie within portions of an existing Mohave County road (Hackberry Road) and US 93, the pipeline owner would consult with these agencies regarding future highway development plans to ensure that the pipeline would not interfere with any planned road expansion, relocation, or reconstruction plans.

As the pipeline generally would be routed through rural countryside, cross-country pipeline construction methods would be used for installation. A typical cross-country pipeline construction sequence is shown on Figure 2-14. An additional specialized construction crew would be required to install the pipeline where it would cross the Big Sandy River.

Prior to the start of construction, the pipeline owner would complete engineering surveys of the right-of-way centerline and extra work areas, and finalize right-of-way easement or lease agreements. Surveys would be conducted using existing roads wherever possible to avoid cross-country motorized travel. Other pipeline or utility operators would be notified through the Arizona Blue Stakes system to locate lines or pipes along the pipeline corridor, and line crossing stipulations obtained from these operators.

The first phase of construction would involve staking the pipeline centerline, construction right-of-way, and temporary work areas, which also would serve as temporary nursery and staging areas for final reclamation activities. Temporary gates would be installed at each fence crossing. For any work within the highway corridor, barricades, signage, and signals would be placed as required by ADOT. The right-of-way then would be cleared of vegetation and brush, and graded only where necessary to create a level work surface. No permanent access road along the pipeline would be constructed. Vehicles would make the maximum use of existing access and only two-track maintenance pathways along the route would be allowed.

Clearing of BLM-managed public lands would be preceded by the salvage of native plant specimens. Grading would be limited to slopes and topography that require leveling to allow safe operation of pipeline construction equipment. Any debris generated would be removed by the construction contractor in conformance with applicable Federal, state, and local regulations.

The pipeline construction company would follow the Federal Energy Regulatory Commission's (FERC) "Upland Erosion Control, Revegetation, and Maintenance Plan" for the management of excavated soils, slope stabilization, and right-of-way restoration and rehabilitation. A Reclamation Operation Maintenance Plan that addresses plant salvage, reclamation, and revegetation, would be followed for BLM-managed lands, and a Reclamation Plan for State and Private Lands would be followed for private and state-owned lands (refer to Section 2.2.8.9 and Appendix B).

In addition, specific ADOT restoration requirements would be adopted for final site reclamation if the pipeline would intrude on ADOT right-of-way. The pipeline company also would implement the following general procedures, as well as additional procedures that might be required by the BLM or the Arizona State Land Department or local soil conservation authorities, for site-specific soil and slope stabilization issues:

- Topsoil would be stripped and piled along the trench for future reclamation use or as requested by landowners during easement negotiations.

- Where topsoil has been stripped, trench spoil would be maintained separate from topsoil.

- The trench would be dug deep enough to allow for at least 3 feet of cover in standard soil conditions to meet minimum 49 CFR 192 safety standards. Within ADOT and Mohave County road corridors, the trench would be dug to allow for a minimum of 5 feet of cover over the buried pipeline, in compliance with the ADOT requirements.